

CLAIMS:

1. A subsea pumping assembly, comprising:

a primary housing adapted to be located subsea, the primary housing having a lower end with a receptacle;

an intake conduit connected with the receptacle for supplying well fluid from a well;

a capsule that lands in the primary housing, the capsule having an inlet that sealingly engages the receptacle for receiving well fluid;

a submersible pump assembly located in the capsule, the pump assembly having an intake for receiving well fluid flowing into the capsule and a discharge for discharging the well fluid from the capsule; and

wherein the capsule with the pump assembly therein is retrievable from the primary housing.

2. The pumping assembly according to claim 1, further comprising a receptacle valve at the receptacle for blocking the flow of well fluid from the intake conduit into the receptacle when the capsule is removed from the primary housing.

3. The pumping assembly according to claim 1, wherein the inlet of the capsule comprises a tail pipe that extends slidingly into the receptacle.

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2 4. The pumping assembly according to claim 1, further comprising a capsule valve at the inlet of
3 the capsule that prevents well fluid in the capsule from leaking out the intake when the capsule is
4 removed from the primary housing.

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6 5. The pumping assembly according to claim 1, wherein the pump assembly comprises a rotary
7 pump and an electrical motor, and wherein the intake of the pump is spaced from the inlet of the
8 capsule to cause the well fluid to flow over the motor as it flows from the inlet of the capsule to
9 the intake of the pump.

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11 6. The pumping assembly according to claim 1, wherein the intake conduit comprises an outer
12 housing that encloses the primary housing, defining a space between the outer housing and the
13 primary housing for the flow of well fluid to the receptacle.

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15 7. The pumping assembly according to claim 1, wherein:
16 the intake conduit comprises a tubular outer housing at least partially embedded in a sea floor;
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19 the primary housing is a tubular member concentrically located in the outer housing, defining an
20 annular space between the primary housing and the outer housing for the flow of well fluid.

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22 8. The pumping assembly according to claim 1, further comprising:
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1 a removable cap mounted to an upper end of the primary housing; and
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3 a lifting profile on the capsule for engagement by a lift line lowered from a vessel at the surface.
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5 9. A subsea pumping assembly, comprising:
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7 a tubular outer housing at least partially embedded in a sea floor;
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9 a tubular primary housing located in the outer housing and having a lower end with a receptacle,
10 the primary housing having an outer diameter smaller than an inner diameter of the outer
11 housing, defining an annular space that is adapted to receive well fluid flowing from a well;
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13 a capsule that lands in and is retrievable from the primary housing, the capsule having an inlet on
14 a lower end that sealingly engages the receptacle for flowing well fluid from the annular space
15 into the capsule, the exterior of the capsule being sealed from exposure to the well fluid by the
16 primary housing;
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18 a submersible pump assembly located in the capsule, the pump assembly having an intake for
19 receiving well fluid flowing into the capsule and a discharge for discharging the well fluid
20 exterior of the capsule; and
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22 a capsule valve in the inlet of the capsule that when closed prevents leakage of well fluid from
23 the capsule, enabling the capsule to be retrieved through the sea without a riser.

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2 10. The pumping assembly according to claim 9, further comprising a receptacle valve at the
3 receptacle for blocking the flow of well fluid from the outer housing into the receptacle when the
4 capsule is removed from the primary housing.

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6 11. The pumping assembly according to claim 9, wherein the inlet of the capsule comprises a tail
7 pipe that extends slidingly into the receptacle.

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9 12. The pumping assembly according to claim 9, wherein the pump assembly comprises a rotary
10 pump and an electrical motor, and wherein the pump intake is spaced from the inlet of the
11 capsule to cause the well fluid to flow over the motor as it flows from the inlet of the capsule to
12 the intake of the pump.

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14 13. A method of pumping well fluid from a sea floor to a surface platform, comprising:

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16 (a) installing a primary housing at the sea floor;

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18 (b) placing a submersible pump assembly in a capsule; then

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20 (c) lowering the capsule from the surface into the primary housing and sealingly engaging an
21 inlet of the capsule with a receptacle of the primary housing; then

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(d) flowing well fluid from a subsea well into the receptacle, through the inlet and into the capsule and pumping the well fluid from the capsule with the pump assembly.

14. The method according to claim 13, further comprising retrieving the capsule for maintenance to the pump assembly by closing a valve at the inlet of the capsule, and retrieving the capsule on a lift line through the open sea, the primary housing preventing exposure of well fluid to the exterior of the capsule.

15. The method according to claim 13, wherein:

step (a) further comprises at least partially embedding a tubular outer housing in the sea floor and landing the primary housing in the sea floor; and step (d) further comprises:

flowing the well fluid down an annular space between the primary housing and the outer housing to the receptacle.

16. The method according to claim 13, wherein step (b) comprises connecting a rotary pump to an electrical motor and positioning the pump and motor such that well fluid in the capsule flows over the motor for cooling the motor as it flows from the inlet of the capsule to an intake of the pump.